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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Joseph P. Meehan

US 010229

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12/12/2006

PHILIPS INTELLECTUAL PROPERTY & STANDARDS

P.O. BOX 3001

BRIARCLIFF MANOR, NY 10510

EXAMINER

TRAN, KHANH C

ART UNIT

PAPER NUMBER

2611

DATE MAILED: 12/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/873,567

Applicant(s)

MEEHAN ET AL.

Examiner

Khanh Tran

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 4-11, 13-15, 17 and 19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13-15 is/are allowed.
- 6) ☒ Claim(s) 4-10 and 19 is/are rejected.
- 7) ☒ Claim(s) 11 and 17 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. The Request for Continued Examination (RCE) filed on 11/27/2006 has been entered. Claims 4-11, 13-15, 17 and 19 are pending in this Office action.

### ***Response to Arguments***

2. Applicant's arguments, see Applicants' Remarks, filed on 11/27/2006, with respect to the rejection(s) of claim(s) 4-10 and 17-18 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made still in view of Cupo et al. (previously cited) and FIG. 1 admitted prior art (previously cited).

See Explanation in the claim rejection below.

### ***Claim Objections***

3. Claims 7, 11 and 17 are objected to because of the following informalities: N needs to be defined in the claims, e.g.  $\leq 2$  .... Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cupo et al. U.S. Patent 5,353,312 (previously cited).

Regarding claim 7, figure 1 discloses a receiver including:

A/D converters 103 104 produces a second sampling rate on A data samples and C data samples. Equalizers 106 and 107 compensate for the distortion in channels A and C, respectively; see column 3 lines 20-35. Outputs of equalizers 106 and 107 are coupled through decision circuits 110 and 111. Outputs from decision circuits 110 and 111 are fed back to serve as reference signals "A" and "C" used to produce error signals to update the coefficients for equalizers 106 and 107; see column 3 line 35 via column 4 line 10. As recited in the last Final Office action, the timing adjustment signals are a function of the delay introduced by each equalizer to one or more predetermined nonzero frequency components of its input signal. This delay is a function of the equalizer coefficients, which are coupled to via leads 124 and 125 to timing recovery circuit 123.

Referring to FIG. 2, in box 215, the update timing deviation  $x_m$  is function of update F and G filter outputs (see box 211), which are also a function of the combination of equalizer delays  $D_A(w)$   $D_C(w)$  .

Cupo et al. does not explicitly teach the timing recovery circuit generating the timing control signal based upon a combination of the N equalized feedback signals.

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However, since the timing recovery 123 generates a timing adjustment signals, which are function of the equalizer delays, which in turn are functions of the equalizer coefficients and the equalizer coefficients are updated based on reference signals A and C, it would have been obvious for one of ordinary skill in the art at the time the invention was made would have recognized that the timing recovery 123 generates a timing adjustment signals based on reference signals A and C. The reference signals A and C correspond to the claimed  $N^{\text{th}}$  equalized feedback signals.

Further in column 2 lines 20-35, the digital data to be transmitted is divided into two different digital signals and each signal is coupled through an associated transmission channel. At the receiver, the received version (channels A and C, see figure 1) of each transmitted signal is processed by an associated equalizer and the outputs therefrom are combined to recover the digital data. In light of the foregoing discussion, the receiver includes two antennas for receiving the two transmitted digital signals.

Regarding claim 6, claim 6 is rejected on the same ground as for claim 7 because of similar scope. Referring to FIG. 1, dual duplex receiver 100 includes dual antennas and dual timing recovery circuits for channels A and C.

5. Claims 8 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cupo et al. U.S. Patent 5,353,312 (previously cited) as applied to claim 7 in view of figure 1 admitted prior art (previously cited) .

Regarding claim 8, Cupo et al. does not teach N carrier recovery circuits as set forth in the application claim.

On page 4 of the original disclosure, figure 1 admitted prior art discloses a receiver, as illustrated in FIG. 1, comprising a Timing Recovery (TR) circuitry employed in conventional chipsets. In FIG. 1, a digital television (DTV) receiver 1 includes a sample rate converter (SRC) 10, a carrier recovery (CR) circuit 12, a square-root raised cosine (SQRC) filter 14 (e.g., a finite impulse response (FIR) filters with a square root of a raised cosine characteristic and a forward equalizer (FE) 16.

In column 4 lines 10-30, Cupo et al. teaches that the clock signal for A/D converters 103 and 104 is provided by receiver timing generator 105 in response to a master clock signal furnished by master clock 122 and to timing adjustment signals provided by timing recovery circuit 123 as shown in figure 1. To compensate for timing offset and drift, the frequency and/or phase of this master clock signal is altered by receiver timing generator 105 using timing adjustment signals provided by the timing recovery circuit 123. In light of the foregoing discussion, Cupo et al. teachings employ coherent detection to compensate for timing offset and drift. Because carrier offset must be estimated at the receiver if the detector is phase-coherent, therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made that Cupo et al. teachings can be modified to implement a carrier recovery (CR) circuit for each receiving path as taught in figure 1 admitted prior art. The implemented CR

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circuit for each receiving path is coupled between the A/D converter and the equalizer as disclosed in figure 1.

Regarding claim 19, claim 19 is rejected on the same ground as for claim 8 because of similar scope.

6. Claims 4-5 and 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Langberg U.S. Patent 5,703,905 (previously cited) as applied to claim 11 above, and further in view of admitted prior art and Bernard Sklar, "Digital Communications Fundamentals and Applications" (previously cited).

Regarding claims 4-5, 9-10 and 13-14, Langberg does not teach the carrier bandpass filter being a square-root raised cosine filter as claimed in the application claim.

Figure 1 admitted prior art teaches a receiver including square-root raised cosine (SQRC) filter 14. Bernard Sklar discloses in the textbook "Digital Communications Fundamentals and Applications" on pages 100-103 that a square-root raised cosine filtering is frequently used in digital communications because of the excellent characteristic of square-root raised cosine function for pulse shaping to reduce intersymbol interference. In light of the foregoing reason, it would have been obvious for one of ordinary skill in the art at the time the invention was made that Langberg teachings can be modified to implement the square-root raised cosine filter. The square-root raised cosine filter is a finite impulse response filter.

***Allowable Subject Matter***

7. Claims 11 and 13-15 allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 11, claim is allowable after Applicant amended claim to include allowable limitations "a timing recovery circuit generating the TR control signal based upon a selected one of the N equalized feedback signals, the combination used to generate an output of the digital receiver".

8. Claim 17 is allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 17, claim is allowable after Applicant amended claim to include allowable limitations "combining the N equalized feedback signals to produce a combined equalized feedback signal" and "producing the TR control signal based on the combined equalized feedback signal".



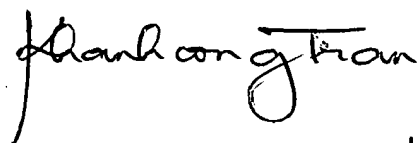
***Conclusion***

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh Tran whose telephone number is 571-272-3007. The examiner can normally be reached on Monday - Friday from 08:00 AM - 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KCT

 12/08/06

Khanh Tran  
Primary Examiner